SCIENTIFIC COOPERATION AND ATLANTIC SECURITY

by

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PROPOSALS to join the countries of the Atlantic community, and possibly the whole free world, in a grand alliance to advance scientific research and development are assured of close consideration at the North Atlantic Council sessions opening in Paris on Dec. 16. Launching of the Soviet sputniks awakened this nation and its allies to the perilous risks of allowing the Communists to outdistance the West in the vital fields of rocketry and missile development. When President Eisenhower, or Vice President Nixon in his place, meets with the heads of government of the 14 other members of the North Atlantic Treaty Organization, one of the main purposes will be to find means of effectively pooling scientific brains and physical resources to safeguard the free world against threats raised by Russian technological progress.

A clue that closer scientific ties among NATO nations would be sought at the Paris meeting was given by the President at a White House dinner, Oct. 17, for Queen Elizabeth of England. In his toast to the Queen the President said: "Our scientists must work together. NATO should not be thought of merely as a military alliance. NATO is a way of grouping ability—of our manhood, of our resources, of our industries and our factories."

Conversations between Eisenhower and British Prime Minister Harold Macmillan at Washington in late October brought reiteration of this theme with added emphasis. The White House conference resulted in formation of two Anglo-American study groups to make recommendations for pooling and joint utilization of resources—one group in "the field of nuclear relationship and cooperation" and one in "the field of military defense, particularly those problems dealing with missiles and rocketry." Eisenhower and Macmillan also issued a joint "declaration of interdependence" which advocated "an enlarged Atlantic effort in scientific research and development." At the same time, the Presi-

dent promised to ask Congress to amend the Atomic Energy Act of 1954 "to permit of close and fruitful collaboration of scientists and engineers of Great Britain, the United States, and other friendly countries."

Views of American Leaders; Proposals for NATO

Addressing the nation from the White House, Nov. 7, on science and security, Eisenhower spoke of "the tragic failure to secure the great benefits that would flow from mutual sharing of appropriate scientific information and effort among friendly countries." "Why," he asked, "for want of the fullest practicable sharing, should we waste American research funds and talent struggling with technological problems already mastered by our friends?" The President's Committee on Scientists and Engineers, reporting on Nov. 30, said the American response to Russian advances must be "marshaling of our brainpower resources in company with other nations of the free world, not only for mutual defense, but to meet the broader challenges of the scientific age we have entered."

Other voices, stressing the urgent necessity of scientific cooperation, also were raised. Edward H. Teller, a leader in development of the hydrogen bomb, told the Senate Preparedness subcommittee on Nov. 25 that he considered it "most important that we cooperate with our very able friends, not only in Britain . . . but across the board in the NATO countries and maybe with other allies." Teller believed the situation to be "dangerous enough to justify, in fact absolutely to require, the fullest cooperation with our allies" in general scientific development and "most particularly in the application of science and technology to the development of weapons." Former Atomic Energy Commissioner Thomas E. Murray, now adviser to the congressional Joint Committee on Atomic Energy, on the same day urged revision of existing law to give the Executive Branch discretionary authority to carry on "the fullest practicable exchange of nuclear information with friendly countries."

The specific proposals which the United States will place before the North Atlantic Council have not been made public. But administration spokesmen were said to have told Congress leaders at the White House, Dec. 3, that this country would agree to wider sharing of nuclear secrets and to stockpiling of nuclear weapons under NATO. France was

considering asking the Council to appoint a commission to work out plans for setting up a North Atlantic scientific foundation. The proposed foundation, operating under the Council, would provide an instrumentality through which NATO countries could make scientists and laboratories available for specific projects of defense value.

Scientific cooperation of another sort will come before the Council in the form of recommendations for NATO sponsorship and financing of programs to expand scientific manpower in the North Atlantic community. The recommendations were drawn up originally by Sen. Henry M. Jackson (D-Wash.) as chairman of a Special NATO Parliamentary Committee on Scientific and Technical Personnel. Approved by the committee and endorsed last month by the Third Conference of Members of Parliament From the NATO Countries, the proposals call for fellowships for advanced scientific scholars, awards to science teachers and students in secondary schools, summer study institutes, and exchanges of scientific personnel. Establishment of a missiles research center in Europe also was recommended by the Parliamentary Conference.

Allied Support of Closer Scientific Relations

There is virtually no dissent in NATO countries to the need for closer scientific relations. Urgent pleas for greater unification of the North Atlantic community have long been coming from Lester B. Pearson, former Canadian Secretary for External Affairs and 1957 winner of the Nobel Peace Prize. Pearson warned on Nov. 3 at Minneapolis: "If NATO cannot continue on the widest possible basis of pooling and partnership, it is not likely to continue at all, at least as an effective organization."[1]

Every NATO nation has strong reasons, military or economic, for supporting more extensive defense collaboration. A White Paper last April revealed Britain's need to hold down defense expenditures and its decision to do so by concentrating on the "nuclear deterrent" at the expense of conventional weapons and forces. British Defense Minister Duncan Sandys welcomed Eisenhower's support of wider NATO cooperation as offering "new prospects which we dared not hope for a few months ago."

[1] Pearson headed a committee of "three wise men," including the foreign ministers of Italy and Norway, which in 1956 urged closer political, economic, and scientific cooperation among NATO countries. See "Future of NATO," *E.R.R.*, Vol. II 1956, pp. 729-747.

France has insisted all along upon carrying through its own atomic development program. Jules Moch, speaking for the French government in October 1956, said his country intended to manufacture fissionable material for military purposes and to stockpile nuclear weapons in the absence of any international agreement to the contrary. French atomic works at Marcoule, scheduled for completion in 1958, will produce enriched uranium at a cost greater than that at which it can be turned out in the United States, but the French have regarded the added cost as "the price of independence." Recently, however, a French senator advocated before the Military Committee of NATO's Parliamentary Conference a "common program, not only in research but in the use of atomic weapons."

Germany is forbidden by the Paris Agreements of 1954 to manufacture atomic, chemical, or biological weapons unless authorized to do so by unanimous vote of member nations of the Western European Union.[2] German manufacture of missiles, warships, and strategic aircraft also is banned unless authorized by a two-thirds vote of W.E.U. members. Chancellor Konrad Adenauer has declared that he has no intention of requesting suspension of these restrictions, but the German government might not oppose such a move if initiated elsewhere.

Objections to Emphasis on Nuclear Armament

Financial and moral objections within Germany may have some effect on that country's part in NATO scientific collaboration. Adenauer told the Bundestag, Oct. 29, that West Germany would be strengthened by closer cooperation, but on the same day Finance Minister Franz Etzel laid stress on a balanced budget.[3] The inference was that Bonn would support more extensive cooperation if the United States would meet the additional costs.

Moral repugnance to atomic weapons is strong among German scientists and among the country's Social Democrats. Eighteen German physicists issued a statement last April opposing German production of atomic weapons. More recently, however, other German scientists have spoken of the desirability of a West German rocket team.

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[2] Belgium, France, Germany, Italy, Luxembourg, Netherlands, United Kingdom.

[3] The German budget for the fiscal year starting Apr. 1, 1958, allows only about $2.4 billion for defense expenditures. That sum represents about 4 per cent of Germany's gross national product—a considerably smaller proportion than that devoted to defense by Germany's allies.

Gen. Leo Zansser, who headed the Nazi V2 rocket project at Peenemunde, told the *Baltimore Sun*, Nov. 8, that Franco-German atomic cooperation, with the Sahara desert as a testing ground, could be very fruitful.

Smaller NATO nations have been loudest in protesting any policy which emphasizes nuclear weapons. A Belgian-Netherlands report to the NATO Parliamentary Conference was particularly critical of British and American reliance on nuclear deterrents at the cost of ground forces to shield Europe from invasion. But the report, submitted Nov. 10, called for "a common defense plan, an equitable division of the common effort, and subsequently a common defense budget." It is clear that the small countries never will be happy with nuclear defenses as long as the Russians threaten nuclear bases, although a greater degree of inter-allied cooperation may allay some of their fears. From the American point of view, cooperation in atomic research with the small members of NATO might provide a way to control the eventual multiplication of nuclear powers.[4]

Limitations of Scientific Pooling as Now Proposed

The generally favorable reception accorded proposals for scientific pooling can be attributed in part to their still indefinite nature. President Eisenhower has publicly come out in favor of a grant of authority to convey to the country's allies only such information as is "already known to the Russians," particularly information on the design and fabrication of atomic weapons. What other secrets might be shared, and with whom, has not been indicated.

The criterion of telling others only what the Russians know would probably cover most atomic and hydrogen bomb secrets. It might not include missile and rocket data, even though today's major defense efforts are concentrated in that area. Such a standard at the least would preclude allied cooperation in fields where the West is ahead of Russia. Even if it were possible to determine easily and accurately what the Russians know, this country's colleagues in NATO hardly could be expected to consider such a limitation fully in line with the goal of interdependence.

Uncertainty shrouds the identity of countries which would be eligible to receive data supplied by the United States. Eisenhower and Macmillan referred to scientific

[4] Klaus Knorr, "Nuclear Weapons: Haves and Have-Nots," *Foreign Affairs*, October 1957, pp. 174-176.

collaboration within NATO, presumably through existing coordinating production committees and weapons agreements. As for sharing atomic secrets, they mentioned only "Great Britain, the United States, and other friendly countries." Since the Eisenhower-Macmillan meeting, the President has added "SEATO and comparable organizations." The latter term might be interpreted to include the Baghdad Pact nations of the Middle East and Latin American members of the Organization of American States. Japan has expressed hope that it may be eligible for information sharing. The State Department reportedly has been studying a more extensive plan to join 50 nations in an agreement to coordinate weapons research and production.

The meaning of the term "pooling scientific resources" has been variously interpreted. Increased exchange of information is at the core of administration proposals, but in many important areas of basic research there is no secret information. The problem there is excess of material rather than access to material, and an effective international program for abstracting and circulating significant information from scientific journals would no doubt be of great service.[5]

Recent statistics and reports suggest that, in view of the increasing preponderance of scientists in Russia,[6] a mere pooling of information in the free world probably would not constitute an effective challenge to Soviet scientific advances. Knowledge that the Communists maintain a United Institute for Nuclear Research, where scientists from 12 Red nations pool their efforts, has stimulated the West to propose such schemes as the plan for a missiles research center advanced by Sen. Jackson's committee and endorsed by the NATO Parliamentary Conference.

Experience with the Manhattan District project for production of the atomic bomb in the 1940s suggests that application of like methods to solution of current problems might

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[5] This would be one of the tasks of the NATO scientific foundation proposed by France. The job is performed in Russia by the 2,300-man Institute of Scientific Information and the Foreign Literature Clearing House. The 200-man National Science Foundation has responsibility in this country for parceling out such work to other organizations. A 35-man Office of Technical Services in the Commerce Department handles reports of research performed under government contract.

[6] Russia turns out twice as many scientists in proportion to population as NATO nations combined. In 1954, Soviet institutions graduated around 104,000 engineers and scientists and American and Western European institutions about 97,000.—Joint Committee on Atomic Energy, *Engineering and Scientific Manpower in the United States, Western Europe, and the Soviet Union* (1956), p. 78. See "Shortage of Scientists," *E.R.R.*, Vol. II 1954, pp. 557-569.

be fruitful. There have been numerous demands for appointment of a missiles czar in this country with authority equal to that exercised by Maj. Gen. Leslie R. Groves of the U.S. Army Corps of Engineers over development of the atomic bomb. Wernher von Braun, who participated prominently in development of the German V2 rocket and is now working at the U.S. Army's Redstone missile center at Huntsville, Ala., cautioned on Nov. 10 against "dangerous organizational experiments" in the missile field, where American scientists have "practically all the facilities we can intelligently use." However, the dramatic success of the wartime gamble with the Manhattan District project makes a powerful argument for similar experiments in free world scientific collaboration.

War and Postwar Scientific Collaboration

THE INITIATION and ultimate success of the $2 billion Manhattan District project stemmed from close collaboration of American, British, German, Hungarian, Italian, Scandinavian and other scientists. Their cooperative endeavors started on an informal basis but eventually were organized under the direction of Gen. Groves. As early as 1939, the official historian of the project reported, "a small group of foreign-born scientists centering on L. Szilard, and including E. Wigner, E. Teller, V. F. Weisskopf, and E. Fermi" persuaded Albert Einstein to approach President Roosevelt on the potentialities of nuclear fission.[7] Anglo-American exchanges of atomic information began in September 1940, and a year later Roosevelt suggested an integrated atomic program to Prime Minister Churchill.

Just before Pearl Harbor, two American scientists visited Britain's nuclear research centers and were impressed by the already well advanced atomic program to which the British had attached the cover name of "Tube Alloys." Britain obviously was racing to produce an atomic bomb ahead of Germany. London's decision to halt independent research and join with the Americans was apparently taken by Churchill in Washington, June 20, 1942, despite

[7] Henry DeWolf Smyth. *Atomic Energy for Military Purposes* (1944), p. 45. The atom had been split in 1937 by two German scientists, Hahn and Strassmann, and the significance of the experiment had been recognized the following year by Meitner, Fritsch, and Bohr.

the fact that "We conceived ourselves at least as far advanced as our ally." [8] Only two days earlier, the U.S. Army Corps of Engineers had received orders to form the Manhattan Engineer District, which was to build the giant atomic plants at Hanford, Wash., and Oak Ridge, Tenn., and the atomic laboratories at Los Alamos, N. M.

From August 1942, when the War Department took over production of the weapon suggested by previous years of research, until July 1945, an international team of scientists concentrated on the basic and technological problems of an atomic bomb. British scientists toured American centers in 1942 and many of them were transferred the following year to the United States or to the Canadian-American-British slow neutron research center in Montreal. Respected scientists from German-occupied countries participated in the program as individuals. In other less dramatic fields scientific teamwork led to perfection of new radio fuses for projectiles, improvement of radar, and development of numerous by-products which ultimately helped to offset the high costs of wartime research.[9]

American-British Friction Over Atomic Exchange

Even with British scientists working in the United States on projects for the common benefit, roadblocks to exchange of atomic information arose. Churchill complained to Harry Hopkins in February 1943 that "At present the American War Department is asking us to keep them informed of our experiments while refusing altogether any information about theirs." [10]

The difficulty, Hopkins explained, was that the atomic project no longer involved research under civilian control, but the design and manufacture of a weapon under War Department regulations. The regulations prohibited transfers of information not serving a definite wartime objective—the "need to know" criterion.[11] Roosevelt promised in May 1943 that the exchanges of information would be

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[8] Winston S. Churchill, *Hinge of Fate* (1950), p. 380. Churchill's estimate is confirmed by Ralph Lapp, who suggests that the earlier absence of complete coordination was "very much to the detriment of the United States, for the British had made significant strides ahead in their scientific approach to the uranium work."—Ralph E. Lapp, *The New Force* (1953), p. 22.

[9] See "Government and Science," *E.R.R.*, Vol. II 1945, pp. 285-289.

[10] Robert E. Sherwood, *Roosevelt and Hopkins* (1948), pp. 703-704.

[11] The resulting compartmentalization was later criticized by many of the scientists involved. Leo Szilard pointed to a specific invention made possible only by the continual "common sense" violation of regulations by the scientists.—Senate Special Committee on Atomic Energy, *Hearings on Senate Resolution 179* (1945), pp. 293-294.

resumed,[12] but other evidence suggests continued friction resulting from the difficulty of reconciling the presidential policy of cooperation with the demands of military security.

Immediately after the war, Congress insisted upon civilian control of atomic energy and American retention of atomic bomb secrets. It was recognized that the so-called secrets lay in technology rather than basic research. As was pointed out by Gen. Groves to the House Military Affairs Committee in 1945, "The big secret was really something that we could not keep quiet and that was the fact that the thing went off."

Still, Americans believed they had a long head start in atomic energy development. They were proud that wartime secrecy had kept the very existence of an atomic project unknown to the enemy. Until an effective international control system could be devised, they did not want to share with anyone the military supremacy conferred by the bomb. The Atomic Energy Commission, which took over control of the Manhattan project on Jan. 1, 1947, was neither prepared nor authorized to divulge any details at all. It was assumed that most other peoples would not question a well-meaning guardianship of the dread weapon by this country.

Americans already were beginning to distrust Soviet Russia, and they were not sure of the ability of all of their transatlantic allies to keep secrets. The Communist sympathies of France's leading nuclear physicists, the Joliot-Curies, were well known. Igor Gouzenko's revelations of a giant Soviet spy ring operating in Canada had recently come out. Even a British physicist, Allan Nunn May, had been convicted of passing Canadian and American research data to the Soviets. Then, six months after the first Soviet bomb explosion in August 1949, it was discovered that Klaus Fuchs, a Briton who had worked at Los Alamos, had been furnishing atomic information to the Russians since 1941. Another shock followed in October 1950 with the mysterious disappearance of the Italian-born British scientist, Bruno Pontecorvo, and his later reappearance in the Soviet Union.

The conclusion drawn by Americans—the more forcefully because Russia exploded a hydrogen bomb in August 1953—was that lax British security procedures were re-

[12] Winston S. Churchill, *op. cit.*, p. 809.

sponsible for the unexpected Soviet progress. Scientists gave somewhat more credit to their Soviet colleagues, but they conceded that information from Fuchs alone could have accelerated the Russian program by as much as a year. American confidence in Britain suffered accordingly.

An executive agreement with Great Britain and Canada, authorizing limited exchange of classified research data, had been sanctioned by the Joint Atomic Energy Committee of Congress in 1948 "largely because [it] . . . established a favorable arrangement with England in the distribution of Belgian Congo uranium ores." [13] However, suggestions in a British memorandum on atomic information, submitted to the State Department in 1950, and proposals to revise the secrecy provisions of the Atomic Energy (McMahon) Act of 1946 were quickly dropped when the Fuchs case came to light.[14]

Machinery for Scientific Cooperation in Europe

Western European countries have been experimenting with various forms of scientific cooperation. Pure research in nuclear energy is a primary aim of the European Organization for Nuclear Research (C.E.R.N.), which was set up in 1950 by the European members of UNESCO[15] and has a laboratory near Geneva. C.E.R.N. directors hope that the organization will eventually become "the focus of a net of inter-European activities in nuclear science," [16] a clearing house for information as well as a laboratory.

The Organization for European Economic Cooperation, established in 1948 to distribute Marshall Plan aid, has played a continuing role in coordinating research projects of its 17 member states. Specific projects to date have concerned such matters as de-salting brackish waters, use of industrial wastes, distribution of scientific manpower. A Steering Committee for Nuclear Energy was named by the United States and Canada in July 1956 for the purpose of encouraging O.E.E.C. countries to develop atomic power and assist them in technical problems.

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[13] Henry M. Jackson, "Problem of Secrecy," *Annals of the American Academy of Political and Social Science*, November 1953, p. 95.

[14] It has been suggested that the Russians may have deliberately betrayed their erstwhile but no longer useful spies in order to discourage further Anglo-American atomic collaboration.—Ralph E. Lapp, *Atoms and People* (1956), pp. 145-148.

[15] United Nations Educational, Scientific and Cultural Organization. Communist countries in Eastern Europe turned down an invitation to join C.E.R.N. Great Britain also refused but has cooperated regularly in research projects and contributed to their support.

[16] L. Kowarski, "The Making of CERN—An Experiment in Cooperation," *Bulletin of Atomic Scientists*, December 1955, p. 381.

The European Atomic Energy Community, which is to come into existence on Jan. 1, is the most far-reaching of European projects for scientific cooperation. Euratom, patterned organizationally on the supranational European Coal and Steel Community, bears some resemblance to the U.S. Atomic Energy Commission but will be devoted solely to peaceful applications of atomic energy.[17] It will establish a community of scientific knowledge and resources for Belgium, France, Germany, Italy, Luxembourg, and the Netherlands.

American assistance on the nuclear projects of other countries has been extended mainly as a part of the Atoms-for-Peace program proposed by President Eisenhower in a speech to the U.N. General Assembly on Dec. 8, 1953. One way in which the United States has carried this program into effect has been to enter into bilateral agreements with 37 countries to provide technical assistance, grants in aid, and small amounts of enriched uranium. Contributions of enriched uranium are to be made also to the new International Atomic Energy Agency, which held its first general conference in Vienna at the beginning of October and which plans initially to develop research programs among member states on peaceful applications of nuclear energy.

Existing Nato Agencies for Pooling in Science

The North Atlantic Treaty Organization has established a framework for coordination of military information, research, and production which might offer a basis for closer cooperation if political obstacles were removed. NATO since 1950 has had experts available under its Defense Production Board to correlate the planning of production programs of NATO nations. Lord Ismay, first NATO Secretary General, has explained that the work of these experts covers:

1. Long-term production planning.
2. Exchange of information and guidance of technical studies.
3. Analysis of equipment requirements and resources.[18]

The experts are divided into about 30 groups, some with continuing responsibility in such fields as air defense radar and spare parts for vehicles, others assigned temporarily

[17] See "European Economic Union," *E.R.R.*, Vol. I 1957, pp. 231-232.
[18] Lord Ismay, *NATO, the First Five Years: 1949-1954* (1956), pp. 128-129.

to such projects as drawing up specifications for propellants and explosives. Lord Ismay reported that together the NATO experts had brought about a degree of cooperation between states "which ten years ago would have been unbelievable." [19]

NATO's Advisory Group for Aeronautical Research and Development was set up at Brussels in 1952 under the directorship of Theodore von Karmann. Its annual budget of $290,000 has been described as probably "dollar for dollar . . . the source of biggest return of any NATO investment." [20] AGARD's activities have included studies of jet engines and compilation of flight test manuals describing every kind of instrumentation in use by each NATO country. The group's specialists have discovered, for example, that Norway has developed a propellant superior for certain purposes, that Italy has an improved method of producing titanium.

European members of NATO cooperate in exchanging information about conventional weapons. Germany and France have gone further by jointly planning the design and development of a medium tank for European use. The Mutual Weapons Development Program initiated in 1954 is the American counterpart. Still highly classified, this project allows the United States to make bilateral contracts with NATO countries for development of specific weapons. The designs are turned over to this country for production with the intention of making the finished weapons available to other NATO members.[21]

LOOSENING OF U.S. NUCLEAR RESTRICTIONS SINCE 1954

Cooperation of the United States with its allies in nuclear military matters has been reluctant and spotty. In July 1949, even before the Fuchs disclosure, members of Congress stopped a Truman administration proposal to explore the possibilities of an atomic partnership with Britain and Canada.[22] The Atomic Energy Act was amended in the autumn of 1951 to authorize exchange of restricted data with foreign countries, but 20 different conditions,

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[19] *Ibid.*, p. 130.

[20] "Agard Is Research Data Exchange," *Aviation Week*, June 3, 1957, p. 325.

[21] Agreements for mutual weapons development have been made with seven unidentified countries. It has been reported that the United States and Great Britain have a separate agreement for collaboration on missiles which assigns basic research to Britain and production to this country.

[22] Henry M. Jackson, "'Problems of Secrecy," *Annals of the American Academy of Political and Social Science*, November 1953, p. 95.

including unanimous approval of the Atomic Energy Commission, approval of the President and of the National Security Council, and passage of a 30-day interval for congressional scrutiny, had to be met before any atomic data could change hands. Exchanges of atomic weapons data were still prohibited.

A year after the Atomic Energy Act of 1954 was passed, however, the United States agreed to transfer within the NATO community atomic information relating to development of defense plans, training of personnel in use of atomic weapons, and evaluation of enemy atomic potentialities. Common guides for declassification of atomic secrets have been worked out at occasional conferences with Britain and Canada. A new guide and faster declassification procedures resulted from such a meeting last year in Washington.

The United States negotiated an agreement with Great Britain in the summer of 1956 providing for transmission of information on the American atomic submarine *Nautilus* in return for information on British gas-cooled atomic reactors. Disapproval by Congress combined with strong British reluctance to supply information to American competitors held up the exchange for a year, but a compromise agreement was reached June 5, 1957.[23]

British and Canadian personnel attended the U.S. Army Ordnance Guided Missile School at Redstone Arsenal for the first time in 1956; officers from Denmark, Italy, and Norway have attended this year. Other NATO training centers or courses are located in Algeria, Britain, France, Germany, and Italy.

PERSISTENCE OF COSTLY DUPLICATION DUE TO SECRECY

Continuing gaps in provisions for exchange of information have led to much duplication of effort among allied countries. France, with 150 Communists in the National Assembly, has suffered most from hesitation to make information available. It cost France about $30 million to develop an anti-aircraft missile several years after similar weapons had been perfected by both Britain and the United States. The nuclear submarine now building in France will take four years to complete and may have to use

[23] Terms of the compromise were not disclosed. The British previously had attempted to limit information to A.E.C eyes and had sought further American information on the Shippingport, Pa., reactor.

cumbersome natural uranium rather than enriched uranium, because *Nautilus* data have not been made available.

The Norwegians were forced to develop their own proximity fuse for mortar shells because the U.S. model was kept secret, and reports indicate that the Norwegian fuse is in some ways superior. The Germans, working on a shoestring, have developed a method of isolating atomic isotopes that is less costly than the American method. France is ahead of the United States in electronics and Great Britain in infra-red missile guidance rays, President Eisenhower pointed out on Nov. 7. Collaboration thus offers this country as well as others opportunities to save time and money.

Scientific Cooperation and Security

THE BIGGEST OBSTACLE to closer scientific collaboration on the part of the United States, the President has declared, is the Atomic Energy Act of 1954. That law amended and liberalized the McMahon Act of 1946, which had prohibited sharing of atomic data with other countries "until Congress declares by joint resolution that effective and enforceable international safeguards . . . have been established."

That condition, slightly modified in 1951, was abandoned in 1954. Section 144(b) empowered the President to authorize exchanges of such restricted data as necessary to:

1. Develop defense plans.
2. Train personnel in employment of and defense against atomic weapons.
3. Evaluate the capabilities of potential enemies in employment of atomic weapons.

Information on the external characteristics, yields, effects, and delivery systems of atomic weapons was allowed to be shared under carefully defined procedures. On no account, however, were data on "the design or fabrication of atomic weapons" to be imparted to other nations.

Amendment of the 1954 act, which Secretary of State Dulles has said may have been made obsolete by Russian achievements, depends primarily on the attitude taken by

the Joint Committee on Atomic Energy, "watchdog of the atom." Created by Congress in 1946 to keep a close eye on the A.E.C. and atomic energy in general, the Joint Committee has taken an aggressive role in atomic policy. It insisted on expansion of uranium procurement, on a crash hydrogen bomb program, on enlargement of bomb stockpiles, and on construction of the Shippingport atomic power reactor in the face of A.E.C. reluctance.

The 18-member committee has been polled on the proposed changes in existing law with varying results. The present chairman, Rep. Carl T. Durham (D-N.C.), a strong advocate of atomic development through private industry, has questioned whether administration proposals for sharing nuclear information go far enough. Vice Chairman Sen. Clinton P. Anderson (D-N.M.) is reported to be leading opposition to revision of the act. Although Anderson has emphasized the value of international cross-fertilization in science and criticized American secrecy as "a modern-day version of the Maginot line philosophy," [24] he indicated on Dec. 3 that he was against giving full discretion to the Executive and opposed telling NATO allies "everything we are planning on."

The other committee members are about equally divided. Most of the Republicans among them are ready to go along with the President, although they may want the committee to have final say on each transaction. Democratic members, on the other hand, assert that the President already has power to exchange much more information on missiles, rockets, and non-atomic weapons than has been released up to now. The Democrats may seek to rewrite the President's proposals, although it is clear that Sen. Jackson will press for more than the President has so far indicated he will request.

Congressional jealousy of atomic secrets is clear. It was made evident in the Joint Committee's refusal to allow any administrative discretion on the issue in the 1954 legislation, notwithstanding administration requests. Distrust of the administration in such matters was indicated as late as the summer of 1957 when Sens. Anderson, Bricker (R-Ohio), Hickenlooper (R-Iowa), and Knowland (R-Calif.) joined to limit future grants of material to the International

[24] Clinton P. Anderson, "For a Positive Program of Atomic Security," *New York Times Magazine*, Sept. 4, 1955, p. 65.

Atomic Energy Agency to amounts specifically authorized by Congress. In view of this attitude, it is the consensus that the President will have to fight hard to win modifications of the act.

American Distrust of Foreign Security Safeguards

Behind congressional hesitation lies, of course, the memory of the Fuchs case and a distrust of foreign security systems. British security safeguards are still questioned. The report in 1955 of a three-man team sent by A.E.C. to examine British security measures was not reassuring. One investigator found the British arrangements satisfactory, but the other two submitted the highly critical LaPlante-Bates report, which apparently impressed Congress.

The British cannot openly explain and defend their security techniques, now reported to have been revised, but the criteria for dismissal of unreliable personnel, and standards applicable to new employees, are said to have been tightened. Other countries have few effective security provisions. French military personnel may be completely reliable, but the strength of Communists in the Assembly and in the French labor movement poses a security threat. Smaller countries, having had no scientific secrets to keep, have been little concerned with the security problem.

Increasing Demand for Freer Scientific Interchange

Indications are increasing that extreme preoccupation with security procedures on the part of American authorities may be on the decline. Secrecy in the Defense Department has been under attack from all sides. Scientists, editors, members of Congress, and former federal officials have been denouncing over-restrictive policies, now somewhat relaxed to show off American rocket and missile progress. Although former Assistant Air Force Secretary Trevor Gardner has held the President personally responsible for tight missiles secrecy, the Army, Navy, and Air Force are much more frequently blamed.

Scientists are almost unanimous in demanding an opening up of the channels for scientific interchange, which they insist is necessary to attain effective scientific cooperation.[25] Teller told the Senate Preparedness subcommittee, Nov. 25, that "We cannot fully cooperate without

[25] By exception, Von Braun has said that "The ideal thing is to have 100 per cent secrecy and all the money we need."—*Life*, Nov. 18, 1957, p. 136.

sharing our secrets." Sharing of secrets, he agreed, increases the probability of leaks, but he thought that "a danger which we must accept because . . . the danger of not cooperating, of falling behind, is in my mind much greater still." He pointed out that secrecy had become less important and speed of development more important.

President Truman, speaking in West Virginia on Oct. 11, attributed the missiles lag to security hearings in 1954 which caused "at least half a dozen" brilliant scientists to leave government service. Former A.E.C. Commissioner Murray recently asked for a review of the case of J. Robert Oppenheimer, leading atomic scientist who was denied access to American nuclear secrets three years ago. Although Murray did not indicate that he had changed the opinion which led him to vote with the A.E.C. majority in the Oppenheimer case, he suggested that a review was called for in the light of present defense needs. In his recommendations for revision of the Atomic Energy Act, Murray said on Nov. 25 that secrecy, previously the dominant element in the law's philosophy, should now be subordinated to the exigencies of a new philosophy based on "the unity of the free world in nuclear affairs."

Dulles's Plea for Upsurge of Interallied Confidence

Secretary Dulles, at a press conference on Oct. 29, gave three ingredients necessary to genuine international cooperation:

> First, there must be more knowledge on the part of each of what the other is doing in his sector of responsibility.
>
> Secondly, there must be a confidence that the element of defense which each is responsible for will, in fact, be used when the critical moment comes.
>
> Thirdly, there must be confidence that it will not be misused, so as perhaps unnecessarily to get us all embroiled in a war without adequate reasons.

The North Atlantic Council's meeting at Paris will indicate how far the United States and its NATO allies are prepared to go toward genuine cooperation in order to catch up with Russian advances. If the Soviet threat appears as menacing to others as to this country, the exchanges of atomic information suggested by President Eisenhower may become the first step toward a significant merging of free world resources.